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The distribution of adult training in European countries

Evidences from recent surveys

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The distribution of adult training in European countries.

Evidences from recent surveys

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Table of Contents

Summary of the main findings

- Training appears to be most evenly distributed across educational attainment levels in Nordic countries whereas a concentration of training on the most educated workers can be observed in some new member states (Poland, Cyprus, Bulgaria and Romania). However, lower educated adult workers participate much less in training than their more educated counterparts. Estimates based on microdata confirm that less-educated workers are significantly less likely to be trained. This is an important finding as most policies fail to affect the distribution of training across different categories of workers.

- In Belgium, Austria and some Nordic countries data indicates no or only a weak tendency to concentrate the training on adult workers whereas a steep fall off in training with age can be seen in Poland, Slovakia and the Baltic States. Estimates based on microdata show that training probabilities decrease significantly with age, confirming a tendency for training to be “front-loaded”.

- Women and men participate in training to a roughly comparable extent, with the exception of the employer-provided training (as indicated by the moderately lower CVTS estimates). The results based on AES microdata show that women are significantly less likely to receive guided on-the-job non-formal training but they are more likely to follow courses or private lessons as part of their non-formal training.

- Lower skilled adult workers participates less in training than their more skilled counterparts do. The differences are consistently larger in several new member states, suggesting a concentration of adult training on the most skilled workers. Training appears to be most evenly distributed across occupational profiles in the Nordic countries (Finland, Sweden, Denmark, and Norway). However, the analysis based on microdata show that low-skilled workers are significantly most likely to receive guided on-the-job non-formal training and this pattern is valid for both *blue and white-collar* workers.

- A key distinguishing feature of high-training economies is that participation in training is more evenly distributed across age and educational groups. This finding suggest that differences in national training systems that affect the overall level of training, operate most strongly through their effects on the extent to which older and less educated workers receive training.

List of Tables and Charts

Introduction

The importance of a highly skilled workforce has become increasingly relevant in the context of the European Union new strategy for smart, sustainable and inclusive growth - 'Europe 2020'. At the individual level, a good education is increasingly decisive for employment prospects and earnings levels. Hence, education and training systems must generate new skills, to respond to the nature of the new jobs, which are expected to be created, as well as to improve the adaptability and employability of adults already in the labour force.[1]

The skills and competences of the workforce are the product of a large variety of learning activities that take place in diverse institutional contexts. While good initial education provides an essential foundation, learning continues through the working years. Policies encouraging wide participation in continuing training are therefore an important component of lifelong learning strategies.

Very little is known concerning differences in the distribution of training and their consequences. Such information would be useful for assessing policy choices related to training, such as whether to encourage an overall increase in training levels or to attempt to redirect training toward certain categories of adults.

This publication attempts to address these issues. The first part uses harmonised data from recent European surveys on continuing training to assemble a set of stylised facts concerning the distribution of training across 28 European countries. Part 2 examines some of these issues in greater depth. Estimates of the individual probabilities of training based on microdata are constructed.[2] A concluding section considers implications for policy in this area.

Several limitations of the analysis require highlighting. In this publication, only two types of adult training are analysed - formal and non-formal training. Moreover, the analysis is limited to incumbent workers between the ages of 25 and 64, since this restriction avoids complications related to differences in initial education and retirement patterns. Because employers subsidy most of the continuing training for their employees, employer-provided job-related training is emphasised.[3] Furthermore, training is only measured in terms of the resources invested and not in terms of the outcomes achieved.

[1] *New Skills for New Jobs*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, COM(2008) 868 final.
[2] Microdata from Adult Education Survey were obtained from Eurostat under a contract (ref. AES 2010/02).
[3] Data on job related non-formal training by employment status is not available in all surveys.

1. The distribution of training

Situations in the European countries differ significantly in terms of the skills profile of their populations or the sector distribution of employment. Improving the monitoring, assessment and anticipation as well as the matching of skills are crucial to address both the employment impact of the crisis and the long-term job prospects of the EU workforce. The education, training and employment policies of the Member States must focus on increasing and adapting skills and on providing better learning opportunities at all levels to develop a workforce that is high skilled and responsive to the needs of the economy. Similarly, businesses have an acute interest in investing in human capital and in improving their human resource management. Moreover, gender equality is a key factor to respond to needs for new skills.

A qualified labour force not only contributes to productivity: investment in well-designed lifelong learning systems can largely offset the economic cost of skills shortages and gaps. If certain groups receive little training, this could significantly restrict their labour market opportunities and result in greater economic inequality. An uneven distribution of training may also lower economic efficiency. There is some evidence that recent trends in technology and work organisation have increased the importance of broad and continuing participation of a firm's workforce in training *(OECD 2004)*.

Despite these equity and efficiency concerns, little is known about whether there are significant differences in the distribution of training. This section uses four European data sources to assess differences in training participation rates across workers grouped by educational level, gender, age, and occupation. Issues related to relationship between the level and the distribution of adult training are also explored.

1.1 Data sources and issues

Several European initiatives coordinated by Eurostat in the last decade have been implemented to collect harmonised data on the continuing training of the adult workforce.[4] In all cases, national statistical offices collect survey data, which are afterwards reported in a common format. With a goal to assemble comparable data, the various initiatives differ however in terms of specific definitions of training activity, the population sampled or the countries and years for which data are available.

Table 1 in the Annex describes some of the main characteristics of training statistics, which are used in this publication: the European Labour Force Survey (LFS), the third Continuing Vocational Training Survey (CVTS3) and the Adult Education Survey (AES). Regarding the instruments for compiling the statistics on training activities, the AES uses the Classification of Learning Activities (CLA). This instrument was designed to be applied to surveys to collect quantitative information on different aspects of participation of individuals in learning, covering all intentional and organised activities (either formal, non-formal or informal), all types of learning opportunities and education and learning pathways. The CLA definitions remain consistent with the classification of educational activities covered in the LFS and based on ISCED where learning is understood to be "*any improvement in behaviour, information, knowledge, understanding, attitude, value or skills*". While ISCED describes learning by the intended outcome, in the CLA the focus is on the process of learning.[5]

[4] For a more detailed description of data sources see CRELL (2007) and Cedefop (2010).
[5] Eurostat, *Classification of Learning Activities - Manual*, Luxembourg (2005).

All these surveys provide measures of the level of continuing education and training among the adult workforce. However, there are important differences in how the training questions are phrased. One important difference is that AES distinguishes between different contexts of education and training, namely formal, non-formal and informal. A second difference is that the CVTS poses the training questions to employers and not workers; there are likely to be systematic differences in how these two groups report training activities. Moreover, respondents in the CVTS are asked to distinguish between initial and continuing training, so that the former can be explicitly omitted from the training estimates.

Another important difference is that the LFS asks about training over the prior 4 weeks, whereas the others use a 12-month reference period. The amount of training reported depends on the reference period covered by each survey. As a result, the retrospective nature of the self-reported training measures can introduce some errors. These errors are expected to increase both with the span of time between the training spell and the interview, and with the detail of the training questions *(Garrouste and Paccagnella, 2011)*. The questions measuring training flows (i.e. the amount of training reported over a specific period) are probably more accurate than those attempting to measure stocks are. Surveys often ask about training incidence, but increasingly try to measure the length of training spells in an attempt to measure more accurately the training effort (*Bassanini et. al, 2005*).

These surveys also differ with respect to how much employer involvement is required for a training event to be reported. While the CVTS only records employer-supported training, other surveys also record job-related training events not supported by the employer. The heterogeneity in training questions introduces problems of comparability between surveys and even within surveys, particularly across countries. The interpretation of the term *'training'* varies across groups in the population, in particular employers, employees, and training researchers. Yet, little is known about the extent to which these conceptual measurement problems lead to actual measurement error. An exception is a study by *Barron (1997)* which uses data from a matched employer-employee survey to see to what extent their responses are consistent. They find that correlations between the worker and the establishment measures are less than 0.5 and that establishments report 25 percent more hours of training on average than workers do. This suggests that training is measured with substantial error.

The population sampled also differs between surveys. The employees between the ages of 25 and 64 years, which are the target population of most of the following analysis, can be exactly identified only in the LFS and AES. The CVTS data cover employees of all ages in the surveyed enterprises. It also excludes workers in enterprises with fewer than ten employees and all workers in certain sectors. This could bias upward the training participation rates since these rates tend to rise with enterprise size over the observed range (*Eurostat, 2002*).

1.2 Educational attainment and the distribution of adult training

The next decade will see an increasing demand for a high-qualified and adaptable workforce and more skills-dependent jobs. The general upward trend in skills demand can be illustrated by looking at required levels of educational attainment, although these are a much-approximated variable for skill levels. In the EU, between 2006 and 2020, the proportion of jobs requiring high levels of education attainment is expected to represent up to 31% of the total whereas jobs requiring medium qualifications would also increase to 50%. At the same time, the share of jobs requiring low levels of education attainment would decline from 26% to 18%. Since the overall

educational attainment increases at a faster rate than labour market changes, workers with low educational attainment will hold half of elementary jobs.[6]

In order to test the strength of the association between the level of educational attainment and participation in adult training, ***Table 1*** presents ratios of training participation rates for workers with a university degree to that for workers who did not complete upper secondary schooling. The greater the value of the ratio, the more strongly participation is concentrated on adults having higher educational attainment levels. These ratios are always in excess of 1 (except for the Czech Republic in AES), suggesting that lower educated adult workers participate much less in training than their more educated counterparts.

Table 1 Training distribution and educational attainment in European countries

Ratios of the participation rates for adults with a university degree to those not having finished upper secondary schooling

		Labour Force Survey [a]		Adult Education Survey [b]		Mean ratio
Countries		Ratio high/low	Rank	Ratio high/low	Rank	
Belgium	BE	4.5	*16*	1.2	*10*	3.8
Bulgaria	BG	:	*:*	1.0	*25*	:
Czech Republic	CZ	12.9	*5*	0.9	*26*	8.6
Denmark	DK	2.5	*23*	1.2	*7*	2.3
Germany	DE	4.1	*17*	1.2	*8*	3.6
Estonia	EE	:	*:*	1.1	*15*	:
Ireland	IE	5.7	*10*	:	*:*	:
Greece	GR	14.3	*3*	1.1	*14*	11.1
Spain	ES	5.2	*13*	1.3	*4*	4.1
France	FR	4.8	*15*	1.0	*19*	3.9
Italy	IT	13.0	*4*	1.3	*3*	9.6
Cyprus	CY	15.2	*2*	1.3	*1*	9.6
Latvia	LV	9.6	*7*	1.2	*9*	7.4
Lithuania	LT	:	*:*	1.1	*13*	:
Luxembourg	LU	4.9	*14*	:	*:*	:
Hungary	HU	10.4	*6*	1.0	*24*	8.9
Malta	MT	7.3	*8*	1.3	*2*	5.3
Netherlands	NL	2.7	*22*	1.2	*11*	2.6
Austria	AT	5.6	*11*	1.2	*5*	4.6
Poland	PL	21.8	*1*	1.1	*16*	16.7
Portugal	PT	6.4	*9*	1.0	*22*	5.2
Romania	RO	:	*:*	1.2	*6*	:
Slovenia	SI	5.6	*12*	1.1	*18*	5.4
Slovakia	SK	:	*:*	1.0	*20*	:
Finland	FI	3.7	*18*	1.1	*12*	2.9
Sweden	SE	3.0	*19*	1.1	*17*	2.3
United Kingdom	UK	2.7	*21*	1.0	*23*	2.3
Norway	NO	3.0	*20*	1.0	*21*	2.4

Source: CRELL calculations based on Eurostat data, see Annex table A1

(:) Missing or not available

a) Percentage of the population aged 25-64 participating in education and training over the four weeks prior to the survey

b) Participation rate in job-related non-formal education and training of adults aged 25-64

The educational attainment ratios are consistently larger in some new member states (Poland, Cyprus, Bulgaria and Romania), suggesting a strong concentration of training on the most educated workers. The extent of concentration varies considerably across countries for any given survey (from 2.5 to 21.8 using LFS data). Training appears to be more evenly distributed across educational attainment levels in some Nordic countries

[6] *New Skills for New Jobs*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, COM(2008) 868 final.

(Denmark, Finland, Sweden, United Kingdom and Norway), whereas it more strongly reinforces differences in human capital in Poland, Greece, Cyprus and Italy.

1.3 Age distribution of adult training

The logic of human capital theory, as well as simple observation of life courses, suggest that skill investments are likely to be concentrated in the early years of an individual's life and career to guarantee higher rates of return. While basic schooling and initial vocational training are generally concentrated in the pre- or early-career years, there may be considerable variations in the extent to which workers continue to receive training in the middle and later parts of their working lives. Yet, too rapid a "tailing off" of training with age could lead to skill obsolescence and create serious employment difficulties for some older workers, while also reducing the adaptive capacity of the economy as the workforce ages in coming decades.

Table 2 Training distribution and age in European countries
Ratios of the participation rates for younger to those for older workers [c]

		Labour Force Survey [a]		Adult Education Survey [b]		Mean ratio
Countries		Ratio adult/older	Rank	Ratio adult/older	Rank	
Belgium	BE	1.5	*15*	1.5	*1*	1.2
Bulgaria	BG	:	*:*	1.0	*22*	:
Czech Republic	CZ	1.9	*11*	0.9	*24*	12.5
Denmark	DK	1.2	*23*	1.1	*16*	8.5
Germany	DE	1.2	*22*	1.2	*11*	6.1
Estonia	EE	2.2	*4*	1.0	*19*	10.0
Ireland	IE	1.7	*13*	:	*:*	:
Greece	GR	:	*:*	1.2	*12*	:
Spain	ES	2.1	*7*	1.3	*6*	3.7
France	FR	1.9	*12*	1.3	*8*	4.6
Italy	IT	1.4	*16*	1.1	*13*	7.1
Cyprus	CY	2.1	*6*	1.2	*9*	5.1
Latvia	LV	2.2	*4*	1.0	*20*	10.5
Lithuania	LT	1.9	*:*	0.9	*25*	13.0
Luxembourg	LU	1.1	*24*	:	*:*	:
Hungary	HU	6.7	*1*	1.0	*18*	9.5
Malta	MT	:	*:*	1.4	*2*	:
Netherlands	NL	2.0	*9*	1.3	*7*	4.1
Austria	AT	1.7	*14*	1.4	*3*	2.2
Poland	PL	2.4	*3*	0.9	*23*	12.0
Portugal	PT	2.9	*2*	1.1	*14*	7.5
Romania	RO	:	*:*	0.9	*26*	:
Slovenia	SI	2.0	*8*	1.4	*4*	2.7
Slovakia	SK	1.3	*20*	1.0	*21*	11.0
Finland	FI	1.4	*19*	1.2	*10*	5.6
Sweden	SE	1.3	*21*	1.1	*15*	8.0
United Kingdom	UK	1.4	*18*	1.3	*5*	3.2
Norway	NO	1.4	*17*	1.0	*17*	9.0

Source: CRELL calculations based on Eurostat data, see Annex table A2
(:) Missing or not available
a) Percentage of the employed population aged 25-64 participating in education and training over the 4 weeks prior to the survey
b) Participation rate in job-related non-formal education and training of adults aged 25-64
c) Older is defined as ages 55-74 in LFS and as 55-64 in AES

Table 2 compares training participation for adults (*i.e*. ages 25-64 years) to that for older workers.[7] The greater the value of the age ratio, the more strongly training is concentrated on adult workers and less on older workers.

[7] Older workers are defined as ages 55-74 in LFS and as 55-64 in AES.

Since values in excess of one predominate, these sources of harmonised training data confirm a tendency for training to be "front-loaded". Belgium, Austria and some Nordic countries have consistently among the lowest age ratios, indicating no or only a weak tendency to concentrate the training on adult workers. The ratio tends to be well above average in Poland, Slovakia and the Baltic States, indicating a steep fall off in training with age.

Recent results based on LFS data confirms the role of late participation in training on the decision of older workers to stay longer on the labour market. Participation in formal training programmes at a later career stage has shown to be among the factors that decrease the expectation of workers to retire early. Enrolling in a learning activity, especially for women, increase the expected time on the labour market and is strongly correlated with the belief that more opportunities for skills upgrading would keep one longer at work *(CRELL 2011, forthcoming)*.

1.4 Gender distribution of adult training

Equalising the labour market opportunities is an important policy goal as the overall efficiency of the labour force is likely to suffer if a large segment, such as women, has inadequate access to training.

Table 3: Training distribution and gender in European countries

Ratios of the participation rates for women to those for men

Survey		Labour Force Survey [a]		Adult Education Survey [b]		Continuing Vocational Training Survey [c]		Mean ratio
Countries		Ratio women/men	Rank	Ratio women/men	Rank	Ratio women/men	Rank	
Belgium	BE	1.1	*27*	0.9	*15*	1.0	*13*	1.0
Bulgaria	BG	1.0	*28*	1.0	*2*	0.8	*27*	0.9
Czech Republic	CZ	1.2	*21*	1.0	*9*	0.8	*26*	1.0
Denmark	DK	1.3	*13*	1.0	*6*	1.2	*1*	1.2
Germany	DE	1.1	*22*	0.9	*19*	0.8	*24*	1.0
Estonia	EE	2.0	*3*	1.0	*5*	1.1	*5*	1.4
Ireland	IE	1.5	*9*	:	*:*	1.2	*4*	:
Greece	GR	1.3	*18*	0.8	*23*	1.2	*3*	1.1
Spain	ES	1.4	*11*	0.8	*25*	1.1	*11*	1.1
France	FR	1.1	*24*	1.0	*8*	0.9	*22*	1.0
Italy	IT	1.6	*6*	0.8	*24*	1.0	*14*	1.1
Cyprus	CY	1.3	*15*	0.9	*17*	1.0	*12*	1.1
Latvia	LV	2.1	*1*	0.9	*13*	1.1	*8*	1.4
Lithuania	LT	2.0	*2*	1.0	*7*	0.9	*19*	1.3
Luxembourg	LU	1.3	*20*	:	*:*	1.1	*9*	:
Hungary	HU	1.5	*7*	0.9	*11*	0.9	*18*	1.1
Malta	MT	1.3	*17*	0.7	*26*	1.2	*2*	1.1
Netherlands	NL	1.1	*26*	0.9	*22*	0.9	*23*	0.9
Austria	AT	1.3	*16*	0.9	*21*	0.8	*25*	1.0
Poland	PL	1.5	*8*	0.9	*12*	1.0	*16*	1.1
Portugal	PT	1.1	*25*	0.9	*16*	0.9	*21*	1.0
Romania	RO	1.8	*4*	1.0	*3*	0.9	*17*	1.2
Slovenia	SI	1.3	*19*	0.9	*20*	1.1	*6*	1.1
Slovakia	SK	1.5	*10*	0.9	*10*	0.7	*28*	1.1
Finland	FI	1.3	*14*	1.0	*4*	1.1	*7*	1.1
Sweden	SE	1.6	*5*	0.9	*14*	1.0	*15*	1.2
United Kingdom	UK	1.4	*12*	0.9	*18*	1.1	*9*	1.1
Norway	NO	1.1	*23*	1.0	*1*	0.9	*19*	1.0

Source: CRELL calculations based on Eurostat data, see Annex table A3

(:) Missing or not available

a) Percentage of the employed population aged 25-64 participating in education and training over the 4 weeks prior to the survey

b) Participation rate in job-related non-formal education and training of adults aged 25-64

c) Percentage of employees (all enterprises) participating in CVT courses

Table 3 presents ratios of the training participation rate for women to that for men, based on data from the harmonised surveys. The values range from 0.7 to 2.1, suggesting that women and men participate in training to a roughly comparable extent, with the exception of the employer-provided training (as indicated by the moderately lower CVTS estimates). Nevertheless, there appears to be moderate cross-survey consistency in the share of training received by women in a specific country. For example, the gender ratios in the Baltic countries are the highest in LFS, indicating that women participate more in the adult training than men do. Similarly, the values for France are consistently among the lowest in LFS, suggesting a relatively equal access to training for both men and women. The average relative training rate for women is lower in AES for all countries, consistent with men having greater access to job-related non-formal training.

1.5 Occupation and the distribution of adult training

Occupational choice is a complex matter and variables such as age, gender, educational attainment or the incidence of adult training, are relevant predictors of the probability of being in a certain occupation.

Table 4: Training distribution and occupations in European countries
Ratios of the participation rates for high skilled workers to those for low skilled

		Labour Force Survey [a]		**Adult Education Survey [b]**		**Mean ratio**
Countries		Ratio high/low	Rank	Ratio high/low	Rank	
Belgium	BE	3.9	*16*	2.3	*13*	3.1
Bulgaria	BG	:	*:*	1.2	*24*	:
Czech Republic	CZ	6.0	*9*	1.5	*22*	3.8
Denmark	DK	2.2	*24*	2.0	*15*	2.1
Germany	DE	6.3	*8*	2.0	*14*	4.2
Estonia	EE	6.9	*5*	2.3	*12*	4.6
Ireland	IE	3.2	*17*	:	*:*	:
Greece	GR	:	*:*	3.6	*3*	:
Spain	ES	4.0	*15*	2.4	*11*	3.2
France	FR	2.8	*19*	1.9	*16*	:
Italy	IT	6.9	*4*	:	*:*	:
Cyprus	CY	9.7	*1*	3.0	*8*	6.4
Latvia	LV	5.6	*10*	3.1	*5*	4.4
Lithuania	LT	7.4	*:*	3.7	*1*	5.5
Luxembourg	LU	4.7	*13*	:	*:*	:
Hungary	HU	6.7	*6*	2.6	*9*	4.7
Malta	MT	:	*:*	:	*:*	:
Netherlands	NL	2.2	*23*	1.6	*19*	1.9
Austria	AT	4.8	*12*	3.0	*7*	3.9
Poland	PL	6.6	*7*	3.2	*4*	4.9
Portugal	PT	5.5	*11*	3.0	*6*	4.3
Romania	RO	:	*:*	3.6	*2*	:
Slovenia	SI	4.1	*14*	2.6	*10*	3.4
Slovakia	SK	8.4	*2*	1.3	*23*	4.8
Finland	FI	2.9	*18*	1.7	*18*	2.3
Sweden	SE	2.4	*21*	1.6	*20*	2.0
United Kingdom	UK	2.3	*22*	1.5	*21*	1.9
Norway	NO	2.7	*20*	1.8	*17*	2.2

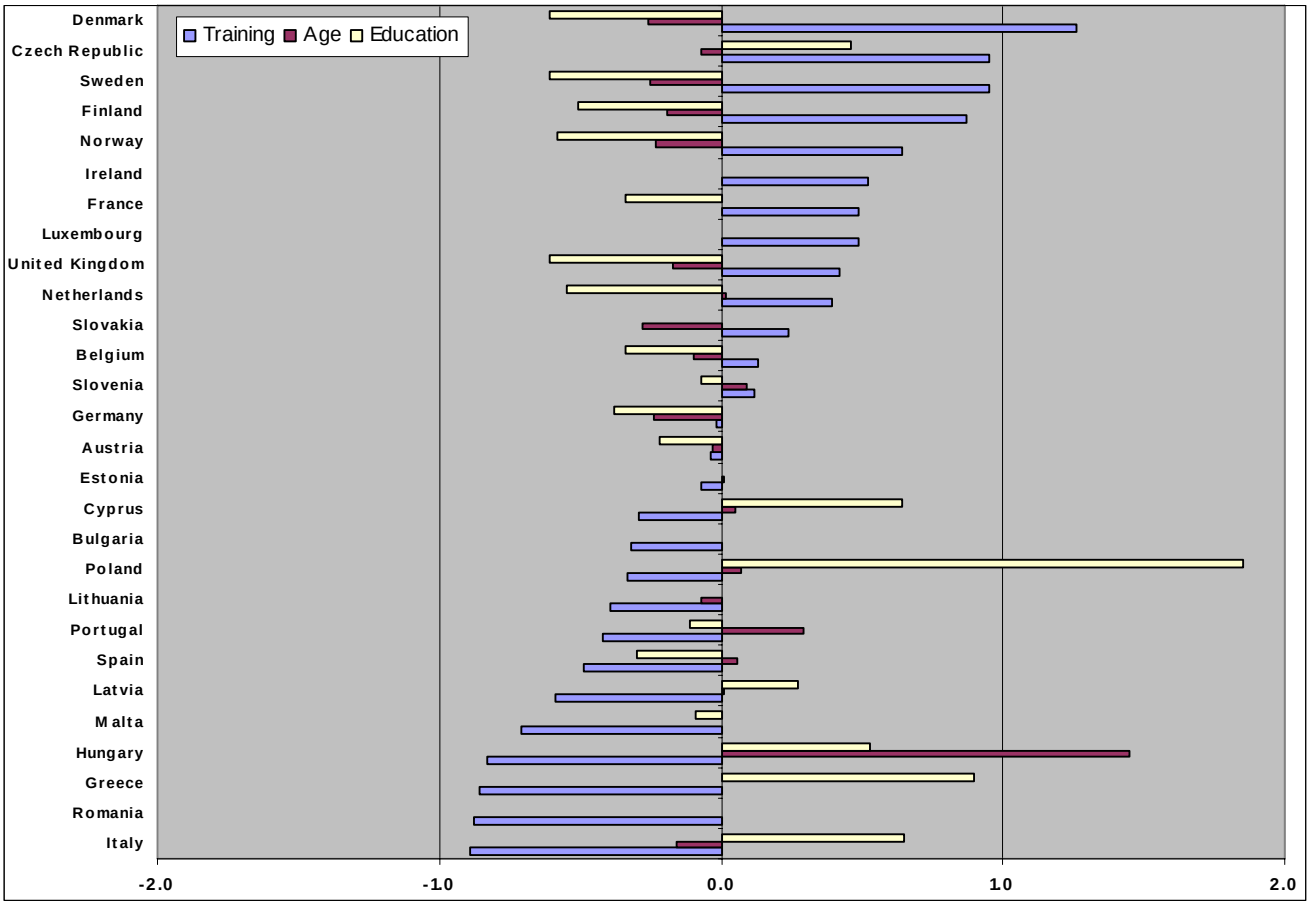
Source: CRELL calculations based on Eurostat data, see Annex table A4
(:) Missing or not available
a) Percentage of the employed population aged 25-64 participating in education and training over the 4 weeks prior to the survey
b) Participation rate in formal or non-formal education and training of adults aged 25-64

In order to test the strength of the association between occupational profiles and adult training, ***Table 4*** presents ratios of training participation rates for high skilled to that for low skilled workers based on harmonised data. The greater the value of the ratio, the more strongly participation is concentrated on adults with higher occupational profiles.[8] These ratios are always in excess of 1.0 suggesting that lower skilled adult workers participates less in training than their more skilled counterparts. They are consistently larger in several new member states, suggesting a concentration of adult training on the most skilled workers. Training appears to be most evenly distributed across occupational profiles in the Nordic countries (Finland, Sweden, Denmark, and Norway).

1.6 The link between the level and distribution of training for adults

Equalising the training opportunities of different categories of adult workers is an important policy goal as the overall efficiency of the labour force is likely to suffer if a large segment, such as the older or the less-educated workers have inadequate access to training. Is there any systematic association between national differences in the level of training and differences in how strongly training is concentrated on younger and more educated workers? This issue is examined in ***Charts 1a and 1b*** by comparing a cross-survey index of participation in adult training[9] and the standardised mean ratios for age, education and occupation.

Chart 1a – Differences in the level and concentration of adult training participation*

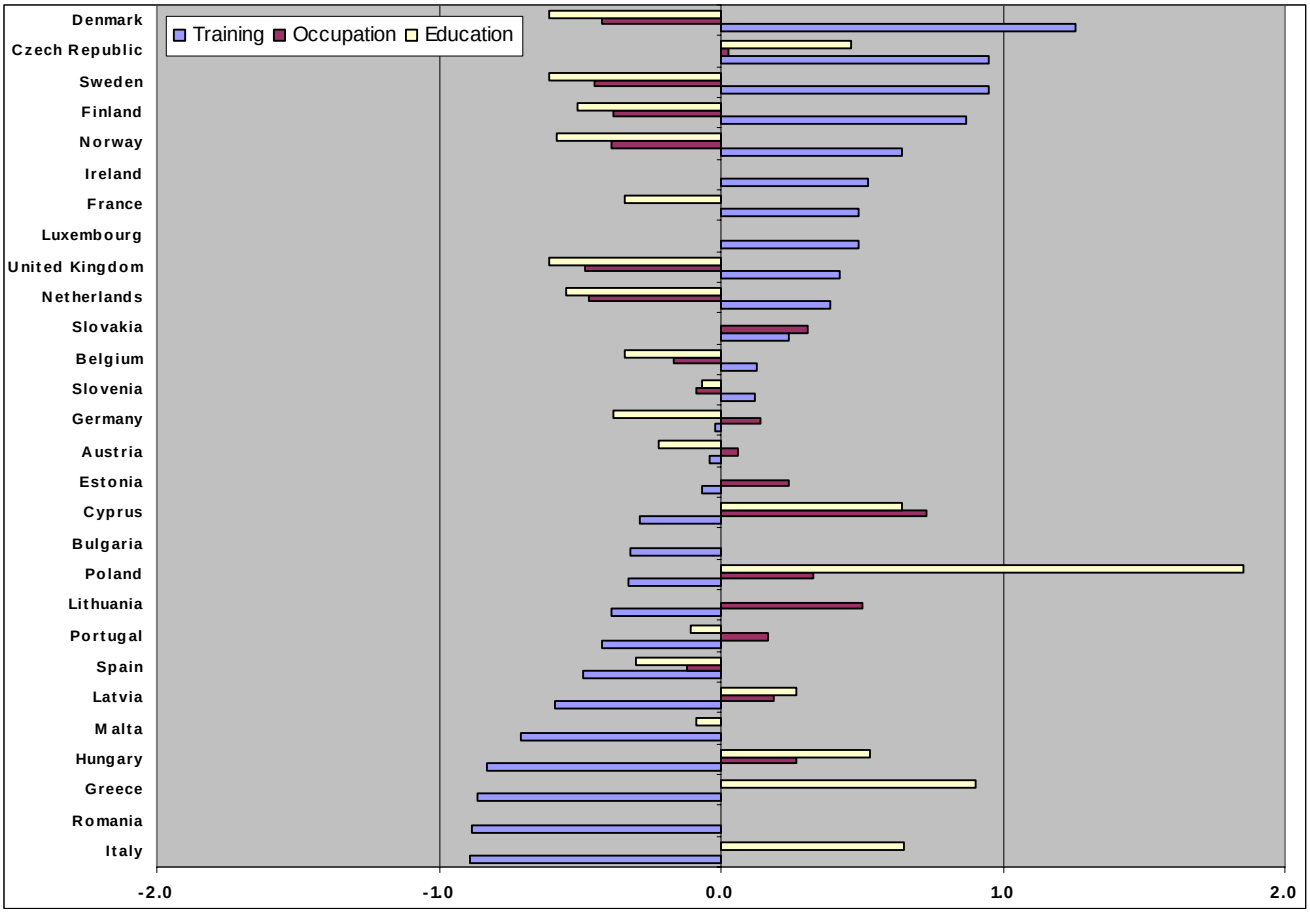


Source: CRELL calculations based on Eurostat data
(*) Countries are ranked in the descending order of the cross-survey index of training

[8] Low skilled workers are those included in categories 8 and 9 (plant, machine operators, assemblers and elementary occupations) whereas high skilled workers are those included in the ISCO 88 categories 1 to 3 (managers, professionals, technicians and associate professionals).
[9] The index is constructed as the unweighted mean of the standardised participation rates, where the average for each country is calculated across only the surveys in which it participated. For details, see ***Table A5*** in the Annex.

As can be seen in ***Chart 1a***, all countries with above-average participation have below-average concentrations of training on younger workers (except for the Netherlands and Slovenia), respectively on the most educated workers (except for the Czech Republic). Similarly, younger adult training tends to be most concentrated in countries with lower participation, although some exceptions occur. In particular, in some countries with below-average participation, the adult training is either highly concentrated towards the most educated workers (Poland, Greece, Cyprus, Italy) or towards younger workers (Hungary, Portugal). On the other hand, Cyprus, Poland and Hungary have below-average participation in training and concentration on both younger and most educated workers. Likewise, the same patterns can be observed in ***Chart 1b*** by comparing the cross-survey index of participation in adult training and the standardised mean ratios for the educational attainment and occupational profiles. Once again, all countries with above-average participation (except Czech Republic and Slovakia), have lower-than-average concentrations of training on the highly skilled workers. On the other hand, low participation goes hand-in-hand with a concentration of training on the higher qualified workers (except in Spain, Malta and to some extent Portugal). Cyprus, Poland and Greece are extreme cases of lower participation and uneven distribution of adult training.

Chart 1b – Differences in the level and concentration of adult training participation*



Source: CRELL calculations based on Eurostat data
(*) Countries are ranked in the descending order of the cross-survey index of training

The association between higher rates and more equal participation in training suggests that differences in national training systems that affect the overall level of training operate most strongly through their effects on the extent to which older, less educated and less-skilled workers receive training. While it is not clear how to explain this relationship, it suggests that institutions or conditions affecting the incentives or resources available to train these three categories of workers may be of particular importance. The cross-survey index of

participation is negatively correlated with the indices of the relative concentration of training on younger, better-educated and highly skilled workers. The next section will go into more details on some of these issues by estimating the individual training probabilities, controlling for a set of covariates.

2. Individual probabilities of training – estimates based on microdata

In order to understand better which factors are most important in explaining the probability that a worker is trained, this section presents results for probit regressions, controlling for a set of covariates.[10] It specifically explores answers to the following questions: Does training accrue mainly to the higher educated? Is there a gender bias in training? Does a small firm train less than a bigger one?

The micro-data used for the analysis are drawn from the Adult Education Survey ***(see Table A in the Annex)***. The survey has the advantage that the samples drawn are large enough to enable one to make reasonable inferences about the reference population (i.e. individuals living in private households aged between 25 to 64 years) and the questionnaires allow one to investigate the determinants of training. AES includes questions on the permanent or temporary nature of the work contract and on the working time (full-time/part-time). Firm size and sector of industrial activity are also recorded in the survey. The reference period over which training is recorded is the year preceding the date of the interview ***(for details see Table B in the Annex)***.

In the AES, the ***formal education*** is defined as the education provided in the system of schools, colleges, universities and other formal educational institutions that normally constitute a continuous 'ladder' of full-time education for children and young people. ***Non-formal education*** is defined as any organised and sustained educational activities that do not correspond exactly to the above definition of formal education. It may therefore take place both within and outside educational institutions and cater to persons of all ages. Depending on country contexts, it may cover educational programmes to impart adult literacy, basic education for out of school-children, life-skills, work-skills, and general culture. Only two forms of non-formal education are analysed: ***private lessons or courses*** (e.g. classroom instructions, seminars, lectures or theoretical/practical courses, workshops, courses conducting through open/distance education) and ***guided on-the-job training***.

Several limitations of the analysis require highlighting. In this publication, only two types of adult training are analysed: formal and non-formal training. Moreover, the analysis is limited to incumbent workers between the ages of 25 and 64, since this restriction avoids complications related to differences in initial education and retirement patterns. Because employers subsidy most of the continuing training for their employees, employer-provided job-related training is emphasised.

Estimations of training probabilities are shown in ***Table A6***. In the model, the probability of being trained is specified as a dichotomous variable, taking the value of one if workers are trained and zero otherwise. The impact of individual and job-related characteristics on the training probability is modelled by means of the following explanatory variables: gender; age; education level; occupation; firm size; tenure with the current

[10] A probit model is a popular specification for an ordinal or a binary response model that employs a probit link function. This model is most often estimated using standard maximum likelihood procedure, such an estimation being called a probit regression. Suppose response variable Y is binary, i.e. it can have only two possible outcomes, which we will denote as 1 and 0. For example, Y may represent the participation in adult training. We also have a vector of regressors X, which are assumed to influence the outcome Y. Specifically, we assume that the model takes form:

$$\Pr(Y=1|X) = \Phi(X'|\beta),$$

where Pr denotes probability, and Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution. The parameters β are typically estimated by maximum likelihood (see Wooldridge, 2009, for details).

employer; working time; type of contract (either permanent or temporary); and industrial sector. For more details, see ***Table C in the Annex.*** The main findings are presented below.

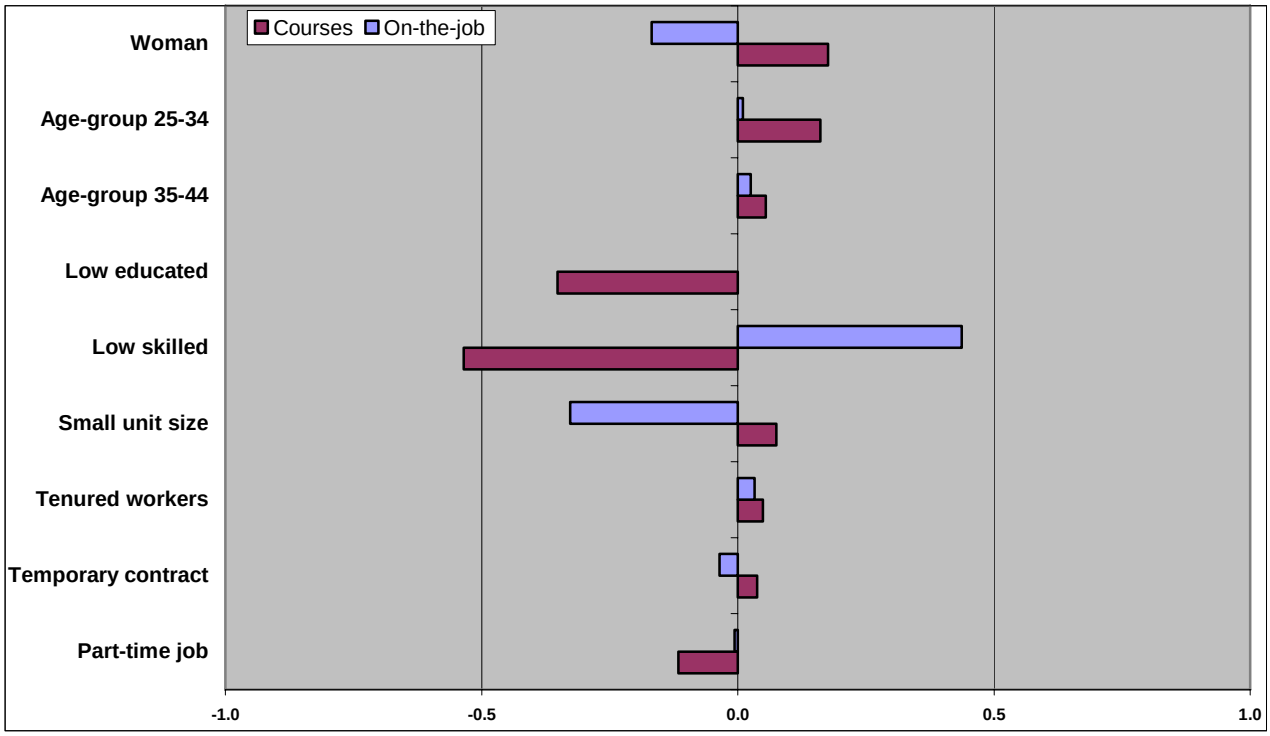
2.a Formal education and training

- Training probabilities decrease significantly with age. This is consistent with the findings in section 1.3; hence, these sources of harmonised training data confirm a tendency for training to be "front-loaded".
- Less-educated workers are significantly less likely to be trained. This is an important finding as most policies fail to affect the distribution of training across different categories of workers.
- Blue-collar workers are significantly less likely to receive formal training. Data show significant drops in the probability to get formal training.
- There is no significant difference between large and small companies/businesses in providing formal training.
- The training probability for formal activities decreases significantly with tenure. This confirms the conclusions of section 1.3 and raises some policy concerns about the inequalities in accessing training programmes for older workers.
- Workers on temporary contracts and in part-time jobs are significantly more likely to receive formal training.

2.b Non-formal training

- Women are significantly less likely to receive guided on-the-job non-formal training but they are more likely to follow courses or private lessons as part of their non-formal training.
- Small companies/businesses are significantly less likely to provide on-the-job training to their workers. This is consistent with some findings from other research (e.g., *OECD, 1999*).

Chart 2 - Training probabilities and the individual, job-related and industry characteristics



Source: CRELL estimates based on AES microdata

- Low-skilled workers are significantly most likely to receive guided on-the-job non-formal training. Data show significant drop in the probabilities to get courses or private lessons as non-formal training; this is valid for both blue- and white-collar workers.
- Workers on temporary contracts and in part-time jobs are less likely to be trained on-the-job.
- Workers in manufacturing, transport and communication and financial services are significantly more likely to receive non-formal guided on-the-job training compared with other industries.

3. Conclusions

Should public policy attempt to expand or redirect the training received by incumbent workers after the period of initial vocational training? While there is no consensus on this question, governments pursue a number of policies directed toward these ends. That the level and distribution of training differs significantly among European countries is supportive of the belief that appropriate policies can create an environment that encourages employers and workers to invest in continuing training.

Unfortunately, the analysis of the determinants and consequences of training is not yet sufficiently developed to provide policy makers with reliable estimates of the economic returns that accrue to any specific policy approaches. Further harmonisation of training statistics could make an important contribution to filling that gap. Nonetheless, it is possible to draw several tentative conclusions with the limited data currently available.

- The strong link between national levels of educational attainment, on the one hand, and the level of workforce training, on the other, suggests that an indirect strategy of strengthening schooling is a potent way of encouraging continuing training.

- Our results also highlight another finding of potential importance for policy making. A key distinguishing feature of high-training economies is that participation in training shall be more evenly distributed across age and educational groups. Policies enhancing the incentives and resources for investing in the continuing training of those workers who typically receive little training could be of particular importance.

- The association between higher rates and more equal participation in training suggests that differences in national training systems are mainly due to their respective capacity to provide training to older, less educated and less-skilled workers. While it is not clear how to explain this relationship, it suggests that institutions or conditions affecting the incentives or resources available to train these three categories of workers may be of particular importance.

- Notwithstanding large cross-countries differences in the amount of training provided, there are common patterns in the allocation of training that emerge from our analysis. In particular, the finding that less-educated workers get less on-the-job training raises some policy concerns. Also important for policy is the conclusion that small firms provide less guided on-the-job training of workers.

Internationally comparative research on worker training is not yet sufficiently advanced to assess the desirability of policies designed to affect training patterns more directly. Options here include minimally interventionist measures, which are intended to create a supportive environment for employers and employees to invest in continuing training.

ANNEX

Table A: Overview of European surveys providing data on continuing training

Name Year(s)	Countries covered	Type of survey	Definitions	Reference period	Observations
Labour Force Survey (EU LFS) ***1983-2009***	**33 countries** All European Union member states, plus Croatia, Iceland, former Yugoslav Republic of Macedonia, Turkey, Norway, Switzerland	EU-LFS is a quarterly large sample survey covering the population in private households. From 1998, it has progressively become a continuous quarterly survey; this transition was completed in 2005. The sample size amounts approximately to 1.5 mill. individuals in each quarter. The quarterly sampling rates vary between 0.2% and 3.3% in each country. The national statistical institutes are responsible for selecting the sample, preparing the questionnaires, conducting the direct interviews among households, and forwarding the results to Eurostat in accordance with the common coding scheme.	***Participation:*** Lifelong learning refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey. Data collected refer to all education or vocational training whether or not relevant to the respondent's current or future employment. They include initial education, additional education, continuing or additional training, training in enterprises, apprenticeships, on-the-job training, seminars and workshops, distance education, evening classes, self-learning, etc. They also include courses followed out of personal interest in subjects such as languages, computers, art, etc. ***Volume of training:*** No data available	**4 weeks**	From 2003 onwards, the definition has been restricted to regular education or other taught activities. Due to the transition to harmonised concepts, breaks in series are reported for several countries.
Adult Education Survey (AES) ***2007***	**29 countries** All European Union member states except Ireland and Luxembourg, plus Croatia, Turkey, Norway, Switzerland	AES is part of the EU Statistics on lifelong learning. The survey has used for the first time a common EU framework including a standard questionnaire, tools and quality reporting. The survey covers participation in education and lifelong learning activities (formal, non-formal and informal learning) including job-related activities, characteristics of learning activities, self-reported skills as well as modules on social and cultural participation, foreign language skills, IT skills and background variables related to main characteristics of the respondents. Relatively small sample size, between 2200 and 27000 individuals in each country (sampling rates vary between 0.01% and 1.14%).	***Participation:*** All learning activities undertaken throughout life, with the aim of improving knowledge, skills and competences, within a personal, civic, social, and employment related perspectives. Learning is defined as any activity of an individual organised with the intention to improve knowledge, skills and competences. Intentional learning (as opposed to random learning) is defined as a deliberate search for knowledge, skills, competences, or attitudes of lasting value. Organised learning is defined as learning planned in a pattern or sequence with the explicit or implicit aims. ***Volume of training:*** Mean instruction hours spent by participant on formal/non-formal education and training.	**12 months**	The Classification of Learning Activities is used. It is designed to be applied to surveys to collect information on different aspects of participation in learning, covering all intentional and organised activities (formal, non-formal or informal) all types of learning opportunities and education and learning pathways
Continuing Vocational Training Survey (CVTS) ***1993, 1999, 2005***	**28 countries (2005)** All European Union member states plus Norway	CVTS is an employer survey of enterprises with 10 or more persons employed belonging to certain NACE categories. CVTS3 provides comparable statistics on training enterprises such as participation in training, the volume of CVT courses and its costs, and some information on Initial vocational training (IVT) courses. The survey is based on common specifications with large sample sizes (50000 enterprises.	***Participation:*** Continuing Vocational Training (CVT) is defined as training measures and activities, which the enterprise finances, partially or entirely, for their employees who have a working contract. A participant in courses is a person who attended one or more CVT courses, at any time during the reference year; participants are counted only once, irrespective of the number of times they attended courses. The courses are events designed solely for providing training or vocational education, which should take place in a training centre located away from the workplace where participants receive instruction from teachers or tutors for a period specified in advance. ***Volume of training:*** Hours in CVT courses per participant. The number of hours includes only the actual training time, excluding any periods of normal work in between training or the travelling time.	**12 months**	CVTS excludes enterprises with fewer than 10 employees or in NACE Rev 1.1 sectors (A, B, L, M, N, P, Q)

Source: Eurostat

Table B: Reference years for data used in this publication

	Interview AES	LFS	CVTS3
Belgium	**02/2007-06/2008**	**2007**	**2005**
Bulgaria	**11/2006-12/2007**	**2007**	**2005**
Czech Republic	**01/2007- 03/2008**	**2007**	**2005**
Denmark	**:**	**2007**	**2005**
Germany	**03/2006 - 07/2007**	**2006**	**2005**
Estonia	**10/2006 -12/2007**	**2007**	**2005**
Ireland	**a**	**2007**	**2005**
Greece	**10/2006 - 12/2007**	**2007**	**2005**
Spain	**02/2006-04/2007**	**2007**	**2005**
France	**01/2006 -01/2007**	**2006**	**2005**
Italy	**05/2005 - 08/2006**	**2006**	**2005**
Cyprus	**05/2006 - 06/2007**	**2006**	**2005**
Latvia	**05/2006 - 06/2007**	**2007**	**2005**
Lithuania	**03/2005 - 04/2006**	**2005**	**2005**
Luxembourg	**a**	**2007**	**2005**
Hungary	**06/2005 - 08/2006**	**2006**	**2005**
Malta	**:**	**2007**	**2005**
Netherlands	**02/2007-04/2008**	**2007**	**2005**
Austria	**04/2006-11/2007**	**2007**	**2005**
Poland	**10/2005 - 12/2006**	**2006**	**2005**
Portugal	**:**	**2007**	**2005**
Romania	**:**	**2007**	**2005**
Slovenia	**09/2006-12/2007**	**2007**	**2005**
Slovakia	**08/2006 - 09/2007**	**2007**	**2005**
Finland	**03/2005 - 08/2006**	**2006**	**2005**
Sweden	**10/2004 - 03/2006**	**2005**	**2005**
United Kingdom	**10/2004-02/2006**	**2005**	**2005**
Norway	**05/2006 - 08/2007**	**2007**	**2005**

Source: Eurostat
(:) Missing or not available, (a) Not applicable

Table C: Definition of variables

EDUCATION/TRAINING	
Formal education	Education provided in the system of schools/colleges/universities or other formal educational institutions that normally constitutes a continuous 'ladder' of full-time education for children and young people
Non-formal education	Any organised and sustained educational activities that do not correspond exactly to the above definition of formal education. It may take place both within and outside educational institutions and cater to persons of all ages. Depending on country contexts, it may cover educational programmes to impart adult literacy, basic education for out of school-children, life-skills, work-skills, and general culture
PERSONAL	
Gender	Male/Female
Age	Age of the respondent
EDUCATION LEVEL	
Low	Individual has no education, or has attained pre-primary or lower-secondary level
Medium	Individual has attained upper-secondary or post-secondary non-tertiary level of education
High	Individual has attained first or second stage of tertiary education
OCCUPATION LEVEL	
'Blue collar'	Low skilled workers are those included in ISCO categories 8 and 9 (plant, machine operators and assemblers and elementary occupations) High skilled workers are those included in ISCO categories 6 and 7 (skilled agricultural and fishery workers, craft and related trade workers)
'White collar'	Low skilled workers are those included in ISCO categories 4 and 5 (clerk and sales workers) High skilled workers are those included in ISCO categories 1 to 3 (managers, professionals, technicians and associates professionals)
JOB-RELATED	
Unit size	Number of persons working at the local unit
Job tenure	Number of years working in the same company
Type of contract	Permanent or temporary contract
Working time	Full-time or part-time
INDUSTRY TYPE	
Manufacturing	NACE category D
Wholesale/Retail trade	NACE category G
Transport/Communication	NACE category I
Financial services	NACE category J
Public administration	NACE category L
Education	NACE category M
Health/Social work	NACE category N

Source: Eurostat – Adult Education Survey Manual

Table A1 Training distribution and educational attainment in European countries

Indicator		Percentage of the population aged 25-64 participating in education and training over the four weeks prior to the survey			Participation rate in formal or non-formal education and training of adults aged 25-64		
		Labour Force Survey			*Adult Education Survey*		
Countries		Low [a]	Medium [b]	High [c]	Low [a]	Medium [b]	High [c]
Belgium	BE	2.8	6.1	12.6	19.8	38.4	63.3
Bulgaria	BG	:	1.4	2.4	15.1	39.2	52.7
Czech Republic	CZ	1.2	4.6	15.5	14.8	36.6	62.4
Denmark	DK	15.4	28.1	38.1	29.9	41.3	62.8
Germany	DE	3.0	7.0	12.3	19.9	45.4	63.2
Estonia	EE	:	5.6	11.3	19.7	35.9	60.6
Ireland	IE	2.3	6.7	13.2	:	:	:
Greece	GR	0.3	2.9	4.3	4	15.2	31.8
Spain	ES	3.8	11.7	19.7	17	35.5	51.1
France	FR	2.7	6.2	12.9	19.1	34.1	57.1
Italy	IT	1.2	9.3	15.6	8.2	30.2	51.4
Cyprus	CY	1.0	5.5	15.2	16	39.5	64.7
Latvia	LV	1.4	6.1	13.4	11	27.2	58.5
Lithuania	LT	:	4.3	12.2	8.8	24.9	61.9
Luxembourg	LU	2.6	7.2	12.8	:	:	:
Hungary	HU	0.7	3.8	7.3	2.6	8.6	19.4
Malta	MT	2.6	11.3	19.0	22.5	42.7	75.5
Netherlands	NL	8.7	17.0	23.2	25.4	42	65.5
Austria	AT	4.2	12.5	23.6	19.1	41.9	68.1
Poland	PL	0.6	3.3	13.1	4.7	15.8	54.4
Portugal	PT	1.5	10.5	9.6	15.9	45.6	63.9
Romania	RO	:	1.6	2.4	1.3	7	20.6
Slovenia	SI	4.7	13.9	26.1	12.7	39	67.6
Slovakia	SK	:	3.0	11.0	14.2	40.8	61.8
Finland	FI	8.7	21.7	32.1	35.2	51.8	72.9
Sweden	SE	10.1	19.2	30.2	55.9	72.4	89.9
United Kingdom	UK	14.7	25.8	39.3	33.4	52.5	62.6
Norway	NO	8.8	15.7	26.1	37.8	51.9	72.3

Source: Eurostat
(:) Missing or not available
a) Pre-primary, primary and lower secondary education (levels 0-2 in ISCED 1997)
b) Upper secondary and post-secondary non-tertiary education (levels 3-4 in ISCED 1997)
c) Tertiary education (levels 5-6 in ISCED 1997)

Table A2 Training distribution and age in European countries

Indicator		Percentage of the employed population participating in education and training over the four weeks prior to the survey		Participation rate in job-related non-formal education and training of adults aged 25-64	
		Labour Force Survey		***Adult Education Survey***	
Countries		Total [a]	Older [b]	Total [a]	Older [c]
Belgium	BE	7.9	5.3	85.3	62.8
Bulgaria	BG	1.3	:	96.3	98.2
Czech Republic	CZ	6.6	3.4	93.3	94.7
Denmark	DK	30.8	24.8	93.1	86.2
Germany	DE	30.6	24.6	88	76.2
Estonia	EE	7.9	3.6	90.5	90.1
Ireland	IE	8.3	4.8	:	:
Greece	GR	2.2	:	84.1	75.4
Spain	ES	11.4	5.5	72.9	56.9
France	FR	7.8	4.1	89.8	72.1
Italy	IT	6.2	4.3	71	59.5
Cyprus	CY	9.3	4.4	80.9	67.3
Latvia	LV	7.9	3.6	84.4	84.5
Lithuania	LT	7.4	3.8	89.3	91
Luxembourg	LU	7.7	7.3	:	:
Hungary	HU	4.0	0.6	81.9	77.1
Malta	MT	8.7	:	70.9	52.3
Netherlands	NL	19.1	9.6	84.7	69.8
Austria	AT	14.0	8.3	80.5	58.3
Poland	PL	6.9	2.9	87.5	87.5
Portugal	PT	3.8	1.3	84	74
Romania	RO	1.4	:	82.6	85.3
Slovenia	SI	17.4	8.6	70.8	49.9
Slovakia	SK	4.6	3.6	92	91.7
Finland	FI	26.7	19.4	85.6	72.1
Sweden	SE	21.2	16.6	88	80.9
United Kingdom	UK	30.6	22.2	76	60.9
Norway	NO	19.3	13.9	93	90

Source: Eurostat
(:) Missing or not available
a) Between 25 and 64 years
b) Between 55 and 74 years
c) Between 55 and 64 years

Table A3 Training distribution and gender in European countries

Indicator		Percentage of the employed population aged 25-64 participating in education and training over the four weeks prior to the survey			Participation rate in job-related non-formal education and training of adults aged 25-64			Percentage of employees (all enterprises) participating in CVT courses		
		Labour Force Survey			*Adult Education Survey*			*Continuing Vocational Training Survey*		
Countries		Total	Men	Women	Total	Men	Women	Total	Men	Women
Belgium	BE	7.9	7.7	8.1	85.3	89	81.2	40	40	39
Bulgaria	BG	1.3	1.3	1.3	96.3	97.2	95.3	15	16	13
Czech Republic	CZ	6.6	6.1	7.2	93.3	95.3	90.7	59	63	52
Denmark	DK	30.8	26.3	35.4	93.1	94.6	91.6	35	32	39
Germany	DE	7.6	7.2	8.2	88	92.6	82.7	30	32	27
Estonia	EE	7.9	5.1	10.4	90.5	92.1	89.4	24	23	26
Ireland	IE	8.3	6.7	10.0	:	:	:	49	46	53
Greece	GR	2.2	2.0	2.6	84.1	92	76.4	14	13	15
Spain	ES	11.4	9.8	13.6	72.9	81.3	64.3	33	33	35
France	FR	7.8	7.4	8.3	89.8	91.8	87.7	46	47	43
Italy	IT	6.2	5.0	7.8	71	78.5	63.6	29	29	28
Cyprus	CY	9.3	8.0	10.6	80.9	84.7	76.8	30	30	30
Latvia	LV	7.9	5.0	10.7	84.4	88.3	82	15	14	15
Lithuania	LT	7.4	4.8	9.8	89.3	91.5	87.9	15	15	14
Luxembourg	LU	7.7	6.9	8.8	:	:	:	49	48	51
Hungary	HU	4.0	3.2	4.9	81.9	84.7	79.3	16	16	15
Malta	MT	8.7	7.9	10.3	70.9	83.4	57.4	32	30	36
Netherlands	NL	19.1	18.5	19.7	84.7	90.5	78.1	34	36	31
Austria	AT	14.0	12.3	16.1	80.5	86.1	74.4	33	36	30
Poland	PL	6.9	5.5	8.4	87.5	90.5	84.7	21	21	20
Portugal	PT	3.8	3.6	4.0	84	87.8	80	28	29	27
Romania	RO	1.4	1.0	1.8	82.6	83.5	81.7	17	18	17
Slovenia	SI	17.4	15.4	19.7	70.8	75.8	66.1	50	47	53
Slovakia	SK	4.6	3.7	5.5	92	94.6	89.3	38	42	31
Finland	FI	26.7	22.9	30.4	85.6	86.8	84.7	39	38	41
Sweden	SE	21.2	16.4	26.0	88	91.7	84.2	46	47	45
United Kingdom	UK	30.6	25.9	35.3	76	80.1	72.3	33	32	34
Norway	NO	19.3	18.2	20.5	93	93.4	92.5	29	30	28

Source: Eurostat
(:) Missing or not available

Table A4 Training distribution and occupation in European countries

Indicator		Percentage of the employed population aged 25-64 participating in education and training				Participation rate in formal or non-formal education and training of adults aged 25-64			
		Labour Force Survey				*Adult Education Survey*			
Occupation groups		*"Blue collar"*		*"White collar"*		*"Blue collar"*		*"White collar"*	
Countries		Low [a]	High [b]	Low [c]	High [d]	Low [a]	High [b]	Low [c]	High [d]
Belgium	BE	3.1	3.2	6.6	12.0	27.4	26.0	50.7	61.7
Bulgaria	BG	:	:	1.6	2.6	48.4	50.4	41.5	57.9
Czech Republic	CZ	2.1	1.9	4.2	12.7	41.5	34.4	42.0	63.2
Denmark	DK	17.1	20.1	31.0	37.6	31.6	40.6	49.9	64.5
Germany	DE	1.9	3.5	6.9	12.0	33.7	38.3	48.8	68.8
Estonia	EE	2.1	:	7.1	14.4	30.1	30.0	50.6	68.5
Ireland	IE	3.7	4.3	8.2	12.0	:	:	:	:
Greece	GR	:	0.7	2.6	3.9	7.7	7.4	21.1	27.5
Spain	ES	5.1	5.4	11.7	20.6	22.1	24.4	37.6	52.9
France	FR	4.0	4.2	7.1	11.3	29.0 p	27.0 p	39.1 p	56.4 p
Italy	IT	1.7	1.4	5.7	11.7	:	:	:	:
Cyprus	CY	1.8	3.3	9.2	17.5	22.4	27.6	50.2	67.1
Latvia	LV	2.6	2.8	6.4	14.6	20.7	19.4	34.2	64.6
Lithuania	LT	2.0	1.8	5.2	14.7	18.8	22.9	40.6	69.2
Luxembourg	LU	2.5	4.5	6.2	11.8	:	:	:	:
Hungary	HU	1.1	1.1	4.0	7.4	7.5	6.1	10.0	19.8
Malta	MT	:	:	6.7	16.3	29.5	16.7	39.5	67.0
Netherlands	NL	10.6	12.5	17.2	23.6	36.4	39.1	47.4	59.8
Austria	AT	4.7	6.4	13.4	22.5	21.5	31.3	53.0	64.5
Poland	PL	1.9	1.5	6.4	12.6	16.5	13.0	25.6	52.1
Portugal	PT	1.5	1.5	4.0	8.3	18.1	14.5	34.7	55.2
Romania	RO	:	:	1.7	2.8	3.9	3.0	16.6	14.0
Slovenia	SI	6.4	8.3	17.1	26.5	25.6	31.9	47.4	65.6
Slovakia	SK	1.1	1.5	3.6	9.2	49.5	41.6	45.2	64.3
Finland	FI	12.6	12.3	25.7	36.1	43.7	43.2	65.0	73.6
Sweden	SE	11.1	9.8	21.0	27.0	57.6	64.0	77.5	91.1
United Kingdom	UK	16.1	17.5	31.5	36.7	41.3	43.2	58.7	63.6
Norway	NO	9.3	12.4	15.8	25.3	38.7	45.5	57.9	68.8

Source: Eurostat

(:) Missing or not available, (p) Provisional data

a) "Blue collar" low skilled workers are those included in ISCO categories 8 and 9 (plant, machine operators and assemblers and elementary occupations)

b) "Blue collar" high skilled workers are those included in ISCO categories 6 and 7 (skilled agricultural and fishery workers, craft and related trade workers)

c) "White collar" low skilled workers are those included in ISCO categories 4 and 5 (clerk and sales workers)

d) "White collar" high skilled workers are those included in ISCO categories 1 to 3 (managers, professionals, technicians and associates professionals)

Table A5 Cross-survey index of adult participation in training for European countries

Survey	Labour Force Survey [a]		Adult Education Survey [b]		Continuing Vocational Training Survey [c]		Cross-survey index	
Countries	Rate (%)	Rank	Rate (%)	Rank	Rate (%)	Rank	Mean	Rank
Belgium	7.9	*13*	85.3	*13*	40	*7*	0.13	*12*
Bulgaria	1.3	*28*	96.3	*1*	15	*25*	-0.32	*18*
Czech Republic	6.6	*21*	93.3	*2*	59	*1*	0.95	*2*
Denmark	30.8	*1*	93.1	*3*	35	*10*	1.26	*1*
Germany	7.9	*13*	88.0	*9*	30	*16*	-0.02	*14*
Estonia	7.9	*13*	90.5	*6*	24	*21*	-0.07	*16*
Ireland	8.3	*12*	:	:	49	*3*	0.52	*6*
Greece	2.2	*26*	84.1	*16*	14	*28*	-0.86	*26*
Spain	11.4	*9*	72.9	*23*	33	*12*	-0.49	*22*
France	7.8	*17*	89.8	*7*	46	*5*	0.49	*7*
Italy	6.2	*22*	71.0	*24*	29	*18*	-0.89	*28*
Cyprus	9.3	*10*	80.9	*20*	30	*16*	-0.29	*17*
Latvia	7.9	*13*	84.4	*15*	15	*25*	-0.59	*23*
Lithuania	7.4	*19*	89.3	*8*	15	*25*	-0.39	*20*
Luxembourg	7.7	*18*	:	:	49	*3*	0.49	*8*
Hungary	4.0	*24*	81.9	*19*	16	*24*	-0.83	*25*
Malta	8.7	*11*	70.9	:	32	*15*	-0.71	*24*
Netherlands	19.1	*6*	84.7	*14*	34	*11*	0.39	*10*
Austria	14.0	*8*	80.5	*21*	33	*12*	-0.04	*15*
Poland	6.9	*20*	87.5	*11*	21	*22*	-0.33	*19*
Portugal	3.8	*25*	84.0	*17*	28	*20*	-0.42	*21*
Romania	1.4	*27*	82.6	:	17	*23*	-0.88	*27*
Slovenia	17.4	*7*	70.8	*26*	50	*2*	0.12	*13*
Slovakia	4.6	*23*	92.0	*5*	38	*9*	0.24	*11*
Finland	26.7	*3*	85.6	*12*	39	*8*	0.87	*4*
Sweden	21.2	*4*	88.0	*9*	46	*5*	0.95	*3*
United Kingdom	30.6	*2*	76.0	*22*	33	*12*	0.42	*9*
Norway	19.3	*5*	93.0	*4*	29	*18*	0.64	*5*
Unweighted mean	**11.0**		**84.5**		**32.1**		**0**	
Standard deviation	**8.3**		**7.3**		**12.3**		**0.7**	

Source: CRELL calculations based on Eurostat data

(:) Missing or not available

a) Percentage of the employed population aged 25-64 participating in education and training over the four weeks prior to the survey

b) Participation rate in job-related non-formal education and training of adults aged 25-64

c) Percentage of employees (all enterprises) participating in CVT courses

Table A6 Results from the probit estimates on adult participation in training

Individual and job-related characteristics	*Formal training*	*Non-formal training*	
		Courses/Lessons	On-the-job
Woman	**.098***	**.176*****	**- .168*****
	(2.4)	*(7.04)*	*(-6.42)*
Age group 25-34	**1.786*****	**.243*****	**.006**
	(17.47)	*(5.6)*	*(.13)*
Age group 35-44	**1.237*****	**.161*****	**- .010**
	(12.24)	*(3.96)*	*(.24)*
Age group 45-54	**.697*****	**.054**	**.025**
	(6.64)	*(1.34)*	*(.59)*
Low educational attainment	**- .468*****	**- .352***	
	(-6.35)	*(-8.73)*	
Medium educational attainment	**- .414*****	**- .326*****	**- .036**
	(-8.6)	*(-11.22)*	*(-.93)*
High educational attainment			**- .318*****
			(-7.71)
Low skilled (*blue collar*)	**-1.065*****	**-.535*****	**.437*****
	(-5.31)	*(-3.52)*	*(2.99)*
High skilled (*blue collar*)	**- 1.344*****	**- .496***	**.410****
	(-6.3)	*(-3.23)*	*(2.77)*
Low skilled (*white collar*)	**- .366**	**- .283***	**- .280**
	(-1.96)	*(1.97)*	*(-1.87)*
High skilled (*white collar*)	**- .123**	**- .041**	**- .067**
	(-.67)	*(-.28)*	*(.47)*
Small unit size	**- .068**	**.075**	**- .327***
	(-.26)	*(.51)*	*(-2.13)*
Large unit size	**- .033**	**- .085**	**.194**
	(-.13)	*(-.61)*	*(1.33)*
Junior workers	**.239**	**.019**	**.041**
	(1.25)	*(.23)*	*(.49)*
Tenured workers	**.098**	**.049**	**.032**
	(.51)	*(.61)*	*(.39)*
Temporary contract	**.364*****	**.038**	**- .036**
	(6.62)	*(.96)*	*(-.88)*
Part-time job	**.187*****	**- .116****	**- .006**
	(2.81)	*(-2.74)*	*(-.14)*
Country dummies	**YES**	**YES**	**YES**
Constant	**- 3.910*****	**2.063*****	**- .923***
	(-6.19)	*(5.18)*	*(-2.29)*
Pseudo R-square	**0.111**	**0.190**	**0.214**
Number of observations	***40 778***	***40 778***	***39 559***
Industry type			
Manufacturing		**- .699***	**.724***
		(.033)	*(.033)*
Wholesale and retail trade		**- .383***	**.412***
		(.041)	*(.041)*
Transport and communication		**- .612***	**.671***
		(.047)	*(.047)*
Financial intermediation		**- .283***	**.488***
		(.056)	*(.056)*
Public administration		**- .289***	**.316***
		(.037)	*(.037)*
Constant		**.388***	**- .479***
		(.021)	*(.021)*
Number of observations		***27 355***	***27 355***

Source: CRELL estimations based on AES microdata

* Significant at the 5% level; ** Significant at the 1% level; ***Significant at the 0.1% level

t statistics in parentheses

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Abstract
The importance of a highly skilled workforce has become increasingly relevant in the context of the European Union new strategy for smart, sustainable and inclusive growth - 'Europe 2020'. At the individual level, a good education is increasingly decisive for employment prospects and earnings levels. The skills and competences of the workforce are the product of a large variety of learning activities that take place in diverse institutional contexts. While good initial education provides an essential foundation, learning continues through the working years. Policies encouraging wide participation in continuing training are therefore an important component of lifelong learning strategies.

Very little is known concerning differences in continuing training or their causes and consequences. Such information would be useful for assessing policy choices related to training, such as whether to encourage an overall increase in training levels or to attempt to redirect training investments toward groups currently receiving little training.

This publication deals with some of these issues. The first part uses harmonised data from European surveys on training to assemble a set of stylised facts concerning differences in the distribution of training across 28 European countries. Part two examine some of these issues in greater depth; statistical techniques are used to analyse individual probabilities of training based on microdata from Adult Education Survey. A concluding section considers implications for policy in this area.

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